THE FEDERAL GOVERNMENT'S EVOLVING VIEW OF FLOODPLAIN MANAGEMENT

by Frank H. Thomas

The nation's coastal and riverine floodplains historically have been and continue to be highly valued as locations for people and property. Consequently, exposure to flood risk is currently estimated to include 16% of the nation's urban land as defined by the 1%-chance flood (Goddard, 1976); and there are six million persons susceptible to coastal storm surge, with an additional 29 million people susceptible to coastal hurricane flooding (White and Haas, 1975). Estimated annual flood losses exceed $3.4 billion and more than eighty lives (U.S. Water Resources Council, 1978). An equally important consequence is that large areas of wetlands, beaches, offshore barrier islands, and flat, usually dry lands adjacent to water bodies are being affected by building and flood control practices, altering the delicate balance of aquatic and terrestrial systems (U.S. Council on Environmental Quality, 1977). It is the purpose of this paper to trace the evolution of the federal role in floodplain management, to discuss the dichotomy of conceptual unity and operational fragmentation, and to identify needs and speculate on future directions for the federal government to take.

EVOLUTION OF THE FEDERAL ROLE IN FLOODPLAIN MANAGEMENT

The development of the current federal role in floodplain management can be conveniently examined by looking first at the period ending in 1966 and then discussing the administrative and legislative actions of the period 1967-1978.

Development of policy for managing flood losses, 1936-1966

Gilbert White (1969) succinctly makes the case that during the period 1936-1966, federal flood loss reduction policy evolved from a single means

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of management (structural flood control measures) to multiple strategies including non-engineering measures such as warning systems and land-use planning. The first major federal commitment to flood control was made in 1917 for construction of a levee on the Lower Mississippi River (U.S. Congress, 1917). In the Flood Control Act of 1936 (U.S. Congress, 1936), federal responsibility for engineering works to modify flood flows was extended to a national scale and broadened to include upstream land-use alternatives. In the 1940s, a proposal that existing federal policy integrate flood insurance, floodplain regulations, and flood emergency adjustment with measures to control floods was unsuccessful (White, 1969). In the 1950s, the Tennessee Valley Authority began to consider social measures for flood loss reduction, although engineering measures were still preferred.

In the first half of the 1960s, the need for social or "nonstructural" measures, such as land-use regulation and disaster insurance, began to win Congressional recognition. At the same time, justification procedures for structural flood control projects came under attack because they included benefits expected from the reclamation of new land as well as from the protection of land already in use. A task force commissioned by the Bureau of the Budget (now the Office of Management and Budget) to prepare a federal flood loss reduction program recommended actions to improve the basic knowledge about flood hazard; to coordinate and plan new developments on the floodplain; to provide technical services to managers of floodplain properties; to adopt a practical national program for flood insurance; and to adjust federal flood control policy to meet sound criteria for changing needs (U.S. House of Representatives, 1966). Presidential and Congressional endorsement of the task force report committed the federal government to flood loss reduction by multiple means, thereby stimulating consideration of flood proofing, emergency measures, land acquisition, land-use regulation, forecasting, and warning systems. The stage was set for a test of the multiple means approach.

Establishment of a concept for national floodplain management, 1966-1978

During the last twelve years, a series of major legislative and executive actions significantly strengthened the multiple means approach, established a national minimum standard for floodplain risk, and expanded the federal role beyond the single purpose of flood loss reduction by adding restoration and preservation of floodplain values.

A 1966 Executive Order directed federal agencies to encourage "a broad and unified effort to prevent uneconomic use and development . . . and . . . to lessen the risk of losses" (The President, 1966). The National Flood Insurance Act and its associated Flood Disaster Protection Act (U.S. Congress, 1968, 1973) make available subsidized flood insurance in return

for community regulation of floodplain development and adoption of the 1%-chance flood as the minimum level of acceptable risk. The Coastal Zone Management Act (U.S. Congress, 1972) complements the Flood Insurance Program by identifying coastal flood hazard areas as "areas of particular concern." The Water Pollution Control Act Amendments of 1972 (U.S. Congress, 1972) make the Corps of Engineers responsible for issuing permits for the disposition of dredge and fill materials, a program that not only improves water quality but also regulates actions that might contribute to increasing flood hazards. The Disaster Relief Act of 1974 (U.S. Congress, 1974) emphasizes federal commitment to disaster preparedness, relief planning, and economic recovery programs; to insurance as a replacement for governmental assistance; and to hazard mitigation measures including land-use and construction regulations. The Water Resources Development Act of 1974, Section 73 (U.S. Congress, 1974), states that the planning and design of flood control projects shall give consideration to nonstructural alternatives such as flood proofing, floodplain regulation, land acquisition, and relocation, and that non-federal cost-sharing for these alternatives shall not exceed 20% of project costs. While portions of these legislative and executive actions have not yet been fully implemented or funded, they illustrate an integrated federal role in flood loss reduction.

The National Environmental Policy Act of 1969 (U.S. Congress, 1969) and its associated Executive Orders 11514 and 11991 (U.S. Council on Environmental Quality, 1977) set protection and enhancement of the nation's environment as a national goal and prescribe procedures for assessing the environmental impact of proposed federal actions. The Coastal Zone Management Act of 1972 (U.S. Congress, 1972) requires state designation of coastal "areas of particular concern" for restoration and preservation of fragile and essential habitats and marine sanctuaries. The Water Pollution Control Act Amendments of 1972 (U.S. Congress, 1972), mentioned before in connection with dredging permits, set waste discharge standards affecting the natural values of all the nation's floodplains.

In 1976, the Water Resources Council built upon the new definition of the federal role with respect to flood loss reduction and restoration of floodplain values and adopted "A Unified National Program for Floodplain Management" (U.S. Water Resources Council, 1976). The central element in the program is the conceptual framework summarized below:

1. Floodplain management is a process by which decisions are made.
2. Every floodplain has a unique set of environmental conditions and human use conditions, each functionally related to other locations.
3. The goals of floodplain management are economic efficiency, environmental quality, health, safety, and the quality of life.

4. Responsibility for achieving goals is constitutionally apportioned among levels of government and private citizens.
5. Determination of goals requires an image of the expected and desired future of each floodplain.
6. Flood loss reduction is a constraint in the decision-making process and not an end in itself.
7. All alternative strategies and tools for flood loss reduction must be given equal consideration. There are three strategies: to modify flooding through the traditional use of physical structures; to modify susceptibility to flooding through nonstructural measures such as land-use regulation; and to modify the impact of flooding through nonstructural programs such as flood insurance and through post-flood recovery measures. The unique conditions of each floodplain require tailor-made mixtures of strategies.
8. All benefits and costs should be publicly accounted for in an open decision process.
9. Positive and negative incentives should be used to motivate decision-making individuals; government policies should support the floodplain management process.
10. Full coordination is needed among agencies at each level of government and between levels of government.

From this summary it is apparent that while a broad, comprehensive structure is provided, natural floodplain values are not treated on a par with flood loss reduction, reflecting the program's origin in the National Flood Insurance Act. Its bias toward flood loss reduction should be corrected by revision of the Unified Program, although the Floodplain Management Executive Order (The President, 1977) and the guideline for implementing the order (U.S. Water Resources Council, 1978) correct its deficiency.

The Floodplain Management Executive Order directs that, whenever practicable, federal agencies should show leadership in floodplain management by avoiding direct or indirect support of development located in floodplains. If avoidance is not possible, the agencies should minimize flood loss risk and preserve or restore natural floodplains. The standards of the National Flood Insurance Program are set as the minimum standards for minimizing flood loss, thus making the 1%-chance flood a national standard applicable not only to communities in the insurance program but also to all federal actions.

Unlike flood loss reduction, floodplain values have no accepted minimum standard. However, the guidelines for implementing the order define floodplain values and functions, discuss the strategies of restoration and preservation, and identify a variety of supporting actions and legislation (U.S. Water Resources Council, 1978). Floodplain values are placed on a

par with flood loss reduction in floodplain management decision-making whenever there is direct or indirect federal support of actions affecting floodplains.

Current situation: conceptual unity and operational fragmentation

The federal government's focus on flood control has evolved from a single purpose/single means (structural flood loss reduction) approach to a multiple purpose/multiple means approach (combined structural/nonstructural reduction of flood losses and acknowledgment of floodplain values). A unified concept of floodplain management has evolved, taking into consideration both flood loss reduction and floodplain values, but the operational capability of the federal government to put its decisions to practical use is another matter. Fragmentation of federal program responsibility complicates selection of tools and strategies tailored to the unique needs of an individual floodplain.

A recent survey of federal floodplain management activities indicates that 28 agencies administer programs with nine different program purposes (U.S. Water Resources Council, 1976). Another study reveals that for the purpose of urban flood reduction during 1974, there were 797 projects involving $795 million implemented by eleven agencies operating under 44 different legislative authorities (U.S. Water Resources Council, 1975). Guidelines for the Floodplain Management Executive Order identify twelve agencies and nineteen major authorities relevant to floodplain values (U.S. Water Resources Council, 1978). Moreover, financial arrangements for non-federal cost-sharing vary from program to program (U.S. Water Resources Council, 1975), a situation that both confuses program applicants and encourages selection of floodplain management tools on the basis of lowest non-federal cost.

From a legislative viewpoint, there appears to be an adequate array of federal floodplain management tools, but there is a problem of fitting them together into an operating whole. The successful experience of the Water Pollution Control Act Amendments of 1972 (U.S. Congress, 1972) suggests a model for a potential Floodplain Management Act. Such an act would require a complete inventory of federal legislation affecting floodplains to serve as a basis for repealing obsolete or unused legislation, cross-referencing and tying together flood loss reduction and floodplain value strategies and tools, and enacting new legislation to fill in voids. A critical element would be establishment of a cost-sharing policy to support the integrated application of floodplain management tools.

New policy directions

The 1977 Environmental Message of the President called for a water resource policy review (U.S. Council on Environmental Quality, 1977). The

resulting Water Policy Study Task Force Reports address items of major concern to urban watersheds and floodplain management: cost-sharing nonstructural measures and conservation (Water Resources Council et al., 1977). The Floodplain Management Executive Order, which accompanied the Environmental Message, specifies a process whereby federal agencies shall lead in floodplain management, especially for federal lands and facilities.

The call for leadership of the Floodplain Management Executive Order can be most rapidly and easily carried out for flood loss reduction. With approximately one-third of the nation's land in federal ownership, major land management agencies such as the Bureau of Land Management, Forest Service, Department of Defense, Fish and Wildlife Service, and National Park Service can operate multiple-means flood loss reduction programs, e.g., the cooperative forecasting-warning-evacuation program of the National Park Service, the Tennessee Valley Authority, the National Weather Service, and the City of Gatlinburg, Tennessee. (Gatlinburg, a resort city located on non-federal land downstream from the Great Smoky Mountains National Park, has catastrophic flash flood loss potential.)

Combinations of flood loss reduction programs for federal buildings and facilities should be managed by agencies such as the General Services Administration, the Department of Defense, the Department of Housing and Urban Development, the Department of Health, Education and Welfare, and the Veterans Administration. Also, for every federal dam, there should be a complete downstream disaster preparedness program. Thus the executive order should foster integrated packages of structural and nonstructural flood loss reduction tools as part of federal land and facilities management.

The Cost Sharing Task Force Report (U.S. Water Resources Council et al., 1977) discusses inconsistencies of cost sharing levels, timing, and form. One of the options covered is consistency among programs with the same purpose, such as urban flood damage reduction. Cost sharing consistency would increase the state and local cost burden for federal reservoir projects, but it would reduce the economic burden of local flood protection projects. Other options would set a minimum level of cost recovery or involve joint financing or grants. The effect of each of these options would be to decrease the relative cost-sharing differentials among tools for structural and nonstructural flood loss reduction and for restoring and preserving floodplains. To be implemented, the options would require congressional action.

Nonstructural measures as alternatives to water projects are cited in the President's Environmental Message and the Task Force Reports. While some nonstructural measures like flood insurance involve federal cost sharing, others are the responsibility of state and local government and no fed-

eral funding is available. This implies greater reliance upon non-federal entities. Some tools with federal authority, such as the purchase and removal of flood-damaged structures, have not been funded but are being reviewed.

Following the emphasis of the Environmental Message on water conservation, the Task Force Reports present options for a stronger federal role in encouraging water conservation, since the costs of providing water supplies and treating wastewater are rising rapidly. A reduction in demand for water should permit deferral or deletion of capital requirements for new water storage facilities and also should decrease demands upon the environment for floodplain sites. Executive or Congressional action could add conservation as a third constraint in the floodplain management decision-making process and establish a Federal program to encourage state water conservation activities. Water conservation efforts could complement efforts to restore and preserve floodplain values.

While the Water Policy Study has focused attention on individual facets of the federal role in floodplain management, a need remains to integrate the federal role with the roles of non-federal entities and to encourage the use of innovative combinations of measures for urban watersheds. We should experiment with formal intergovernmental floodplain management agreements, such as flood loss reduction agreements, to produce strategies appropriate for a given floodplain. Parties to such an agreement would include each level of government as well as affected non-governmental entities and individuals.

The agreements should include an explicit definition of risk conditions, an understanding of "acceptable" levels of risk, and formal assignment of responsibility for risk. Risk definition would establish the physical extent and nature of flood conditions and identify the people and property exposed under differing con litions. Specifying an acceptable level of risk would be necessary to determine minimum levels of protection and residual risk. Assignment of responsibility for risk would cover amounts to be paid for protection measures and for residual losses, when and by whom. Through such an agreement the most desirable or acceptable mix of flood loss controls could be agreed upon. For example, local government could pass ordinances tailored to risk standards, state government could plan for evacuation and relief, the federal government could provide forecasting and insurance, and individuals could be responsible for flood proofing.

Two problems could be alleviated by intergovernmental agreements. First, there simply is not enough federal money to carry out all of the 1280 currently authorized projects at an estimated cost in excess of $35 billion. Second, the initiative for federal floodplain management activities rests with state and local governments and private individuals; few federal flood loss reduction activities are initiated without application or request from a

non-federal entity. Intergovernmental agreements should lead to coordinated, realistic initiatives responsive to local needs.

SUMMARY

The major points presented in this paper can be summarized as follows:

The federal role in national floodplain management is clearly conceptualized, but it is currently fragmented across numerous agencies and programs.

There appears to be less need for new legislation than for the tying together of existing legislation followed by effective implementation.

The Water Policy Review emphasizes the need for nonstructural measures, modification of cost sharing, and water conservation.

The Floodplain Management Executive Order promises strong federal leadership by good example.

Finally, the initiative for almost every floodplain management program rests outside of the federal government. It is up to local governments and the states to determine the desired future for individual floodplains and to identify the strategies necessary to realize that future. The "intergovernmental agreement" concept holds promise for harnessing initiatives and "packaging" the available tools and strategies into more effective floodplain and urban watershed management.

REFERENCES CITED

GODDARD, JAMES E., 1976. "The Nation's Increasing Vulnerability for Flood Catastrophe," *Journal of Soil and Water Conservation* **3**, No. 2 (March-April 1976): 44-62.

THE PRESIDENT (Lyndon B. Johnson), 1966. Executive Order 11296; Evaluation of Flood Hazard in Locating Federally Owned or Financed Buildings, Roads, and Other Facilities, and in Disposing of Federal Lands and Properties. *Federal Register*, Vol. 31, No. 155—Thursday, August 11, 1966.

THE PRESIDENT (Jimmy Carter), 1977. Executive Order 11988; Floodplain Management. *Federal Register*, Vol. 43, No. 29—Friday, February 10, 1978, pp. 6030-6055.

U.S. CONGRESS, Public Law 64-367, Flood Control Act of 1917.

U.S. CONGRESS, Public Law 74-738, Flood Control Act of 1936.

U.S. CONGRESS, Public Law 90-448, National Flood Insurance Act, 1968.

U.S. CONGRESS, Public Law 91-190, National Environmental Policy Act of 1969.

U.S. CONGRESS, Public Law 92-500, Federal Water Pollution Control Act Amendments of 1972.

U.S. CONGRESS, Public Law 92-583, The Coastal Zone Management Act, 1972.

U.S. CONGRESS, Public Law 92-234. Flood Disaster Protection Act of 1973.

U.S. CONGRESS, Public Law 93-251, The Water Resources Development Act of 1974.

U.S. CONGRESS, Public Law 93-288, Disaster Relief Act of 1974.

U.S. COUNCIL ON ENVIRONMENTAL QUALITY, 1977. *The President's Environmental Program*. U.S. Government Printing Office, Washington, D.C.

U.S. HOUSE OF REPRESENTATIVES, 1966. *A Unified National Program for Managing Flood Losses*, House Document 465. U.S. Government Printing Office, Washington, D.C.

U.S. WATER RESOURCES COUNCIL, 1975. Technical Report of the Section 80(c) Study (P.L. 93-251), Vol. 8D: *Compilation of Cost Sharing Statutes by Department/Agency/Purpose*. U.S. Government Printing Office, Washington, D.C.

U.S. WATER RESOURCES COUNCIL, 1976. *A Unified National Program for Floodplain Management*. U.S. Government Printing Office, Washington, D.C.

U.S. WATER RESOURCES COUNCIL, U.S. COUNCIL ON ENVIRONMENTAL QUALITY, and OFFICE OF MANAGEMENT AND BUDGET, 1977. *Task Force Reports, Water Resources Policy Study*. Washington, D.C., Dec. 6, 1977.

U.S. WATER RESOURCES COUNCIL, 1978. "Floodplain Management Guidelines for Implementing Executive Order 11988," *Federal Register*, Vol. 43, No. 29—Friday, February 10, 1978.

U.S. WATER RESOURCES COUNCIL, 1978. "Flood Damage Management and Related Resource Considerations," in *The Nation's Water Resources, The Second National Assessment*, Part III (review draft), Washington, D.C., pp. 290-311.

WHITE, G. F., 1969. *Strategies of American Water Management*. Ann Arbor, MI: University of Michigan Press.

WHITE, G. F. and J. EUGENE HAAS, 1975. *Assessment of Research on Natural Hazards*. Cambridge, MA: MIT Press.